DELAWARE CENTER FOR THE
INLAND BAYS
Research. Educate. Restore.

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Inland Bays Journal

Return of the Wild

By Katie Goerger, Communications Specialist

The living is good around the Inland Bays—and the secret is out.

The full time population of the Inland Bays watershed has topped 90,000, nearly double the number of people that were here 25 years ago. Add to that the influx of part time residents and summer visitors, and some are feeling the pressure—including our native plants and animals.

As urbanization has occurred around the Bays, we have lost large tracts of wetlands and forests that harbor native plants and provide animals with food, shelter and nursery grounds. But there is good news. Advances in science and technology, and more effective management of habitat and species have resulted in some conservation success stories.

In forests and fields around the Bays…the wild turkey

By the 1980's, the wild turkey population was nearly gone in Delaware due to overharvesting and the loss of forests that provide roosting trees and feeding grounds where turkeys scavenge nuts, berries, insects, and snails.

In 1984, in an effort to restore the population, biologists with the DE Division of Fish & Wildlife released 34 wild turkeys into Sussex and Kent counties, relocated from other states. The re-introduction continued for two decades as scientists collected data to monitor reproduction, survival rates and predation.

(continued on page 6)

What's Inside

Down to Zero, see page 3–4.

A Win for the Bays, see page 4–5.

Who's on Board with the Bays?, see page 7.

The Inland Bays Journal is a publication of the Delaware Center for the Inland Bays. The CIB is a nonprofit organization and a National Estuary Program. The purpose of the Inland Bays Journal is to educate and inform citizens and visitors to the Inland Bays watershed about this "estuary of national significance."

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Two wild turkey toms *Meleagris gallopavo* walking through a woodland in autumn. Photo credit: Steve Maslowski U.S. Fish and Wildlife Service

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Great blue heron
Photo credit: Dr. Dennis Bartow

Dear Friends of the Bays,

Often I'm asked how the Inland Bays are doing. It is a simple question with complex answers, but most of those involve keeping nutrients out of the Bays.

In this issue, we report on two important achievements in eliminating excess nitrogen and phosphorus from our creeks and bays—they are the major pollutants and the greatest threat to our water quality. The first success is the removal of what we call 'point source' pollution…the kind you can point to…it usually comes out of a pipe. **Twenty years ago, there were thirteen point sources of pollution to the Bays. Now there is one.** Read 'Down to Zero' to understand this watershed-sized achievement.

The second success story involves 'nonpoint pollution'—much of which enters the groundwater and flows to creeks and bays. One source of groundwater pollution is residential septic systems. **Read 'A Win for the Bays' to find out how Sussex County has helped eliminate over 23,000 septic systems.**

Big achievements like these are the work of many partners, and we would like to recognize the contribution of Mike Izzo, Sussex County's engineer. After 31 years of improving wastewater treatment in Sussex County, Mike is leaving county service. Mike's portfolio included more than wastewater; he oversaw a staff of 150 people designing, constructing and maintaining county projects; but we're especially grateful for his work to improve and expand public wastewater treatment in the Inland Bays watershed.

When I asked Mike about a pivotal accomplishment during his career with the county, he immediately reflected on Long Neck. In the early-eighties, the toilets of the Inland Bays' most populous peninsula were being flushed to thousands of individual septic systems; most located uncomfortably close to the Bays. Mike was instrumental in the creation of the Inland Bays Regional Wastewater Facility, Delaware's first municipal spray irrigation plant. When the plant went online it immediately received and treated the waste from 7,000 septic systems on Long Neck. He remembers that some local residents noticed a difference right away and remarked on the cleaner water. The advent of spray irrigation as a method of wastewater disposal opened up a whole new avenue of beneficial reuse of wastewater during Mike's tenure.

When asked for his thoughts on Rehoboth's decision to divert its direct discharge of treated wastewater from Rehoboth Bay to an ocean outfall, he said it was the right decision. During his tenure, he oversaw the South Coastal Wastewater Treatment plant that discharges treated wastewater to the ocean near Bethany Beach. In 2008, this plant received an award for excellence in operations and maintenance by the US EPA.

We wish Mike the best in his new position at Wallops Island. It is through the positivity and commitment of individuals like him that we can all work together to improve the Bays.

Chris Bason, Executive Director

DOWN TO ZERO

By Dr. Marianne Walch, Science and Restoration Coordinator

In 1994, when the Delaware Center for the Inland Bays was formed, there were thirteen 'point sources' discharging pollution into the Inland Bays. Point Source Pollution is pollution that comes from a single, identifiable place, typically a pipe discharging from an industrial facility or wastewater treatment plant.

In the last twenty years, significant progress has been made toward meeting the goal of zero loading of nutrients from point sources to the Inland Bays.

The pollution of greatest concern in the Inland Bays is nutrient pollution. Nutrient pollution occurs when too much nitrogen and phosphorus enters the waters causing a condition called eutrophication. This condition can lead to fish and shellfish kills, toxic algal blooms and the loss of seagrass beds which are important feeding and nursery areas for much of our bay's marine life.

As facilities removed their discharges or upgraded their treatment processes over the next two decades, point source loads to Rehoboth and Indian River Bays decreased by about 409 lbs. per day for nitrogen (an 82% reduction) and 44 lbs. per day for phosphorus (87%reduction).

Update on the remaining three Inland Bays point sources:

CITY OF LEWES

The treated discharge from the Howard Seymour Water Reclamation Plant of the City of Lewes is released into the Lewes and Rehoboth Canal, but only a portion of that load reaches Rehoboth Bay. The plant was upgraded in 2008 to include a wastewater treatment technology known as a Membrane Bioreactor Process, or MBR. This process combines a Xenon ultrafiltration system (used to treat drinking water) with biological treatment, followed by ultraviolet disinfection. As a result, minimal loads of nitrogen and phosphorus are discharged into the canal. The most recent permit issued by the state for this plant in 2012 requires the City to offset this remaining modest discharge by funding nutrient management projects, such as manure relocation, elsewhere in the Rehoboth Bay Watershed.

(continued on page 4)

This did not happen without hard work and commitment.

In the late 1990's, the state enacted regulations to put the three Inland Bays and their tributaries on a 'pollution diet' by establishing Total Maximum Daily Load (TMDL) limits for nitrogen and phosphorus. Not unlike counting calories to lose weight, a TMDL is the maximum amount of a pollutant that can enter the water body and still meet water quality standards.

In 2008, the State of Delaware enacted the Inland Bays Pollution Control Strategy (or PCS) that prescribed actions that would be required to address all sources of pollution in order to meet the Inland Bays TMDLs. The TMDLs and the PCS called for the removal of all point source discharges of nutrients into the Bays.

When the 2011 State of the Bays report was published, only three significant discharges remained. These were the wastewater treatment plants in Millsboro, Lewes, and Rehoboth Beach.

Since then, all three towns have continued to work with the state to remove their nutrient discharges from Inland Bay waters. With progress on plans for Rehoboth Beach to move its outfall from Rehoboth Bay to the ocean, we are almost there. This is great news for our Bays!

(ZERO continued from page 3)

THE TOWN OF MILLSBORO

Millsboro completed a full upgrade of its wastewater treatment plant to an MBR and developed a plan for beneficial reuse of the treated water through land application. The MBR treatment process started up in September 2009, but early system failures led to continued permit violations. The technical problems eventually were resolved, and in March 2013 spray irrigation of a portion of the treated wastewater was started on the grounds of Millsboro Middle School. Kenny Niblett, Millsboro Director of Public Works, reports that currently they are testing use of irrigation and rapid infiltration basins for disposal of the remaining effluent on the Town's beneficial reuse farm on Rt. 20.

THE CITY OF REHOBOTH BEACH

This is the last major point source of nutrient pollution entering the Inland Bays. Upgrades to the City's treatment facility were made in the late 1990's and early 2000's. These upgrades included improved aeration control for better nitrogen removal, and chemical additives to remove phosphorus.

Despite these improvements, over 17 thousand pounds of nitrogen and 2,600 pounds of phosphorus continue to be discharged each year from the plant into the Lewes and Rehoboth Canal and Rehoboth Bay. In future years, with increasing development and population, annual loads of nutrients discharged from the plant are expected to more than double.

After detailed studies and the evaluation of options, the city plans to build an ocean outfall from its treatment facility in order to comply with orders to cease its discharges into Rehoboth Bay. Although not without controversy, recent progress toward construction of the proposed ocean outfall is unequivocally good news for Rehoboth Bay. Due to the poorly flushed nature of our coastal bays, removal of the Rehoboth Wastewater Treatment Plant's direct discharge into the Bay is a critical step in restoring water quality and aquatic habitat there.

Central sewer expansion on Angola Neck.

A WIN for the

By Sally Boswell, Education & Outreach Coordinator

"In the mid-80's, when we began to focus on removing septic systems from the Inland Bays watershed, we found a little bit of everything," said Mike Izzo, retiring County engineer. "Some people didn't even know what type of system they had. They thought they had a working septic, but in some cases, we found cesspools. And on some properties around the Bays, a pipe carried sewage right into a creek behind the house."

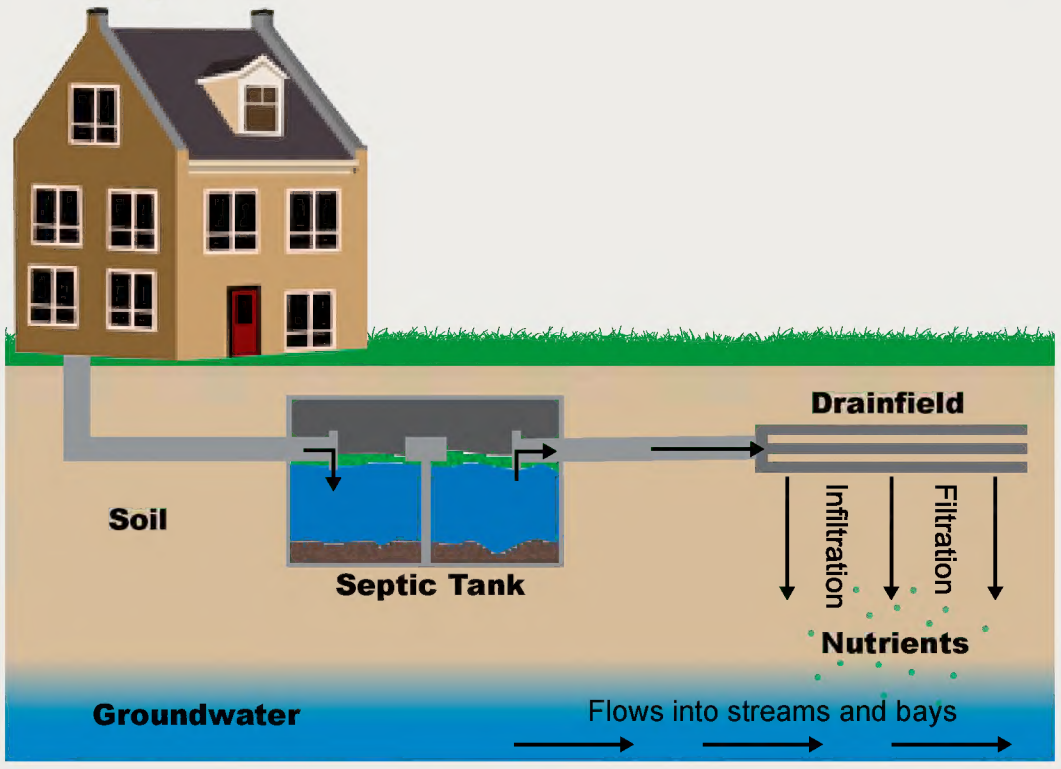
The strategy was to triage…identify the communities that were impacting the Bays the most and address them first. "To this date, we have removed over 23,000 septic systems…80-90% of septic systems from high impact areas are gone, with most of the critical areas finished and on public sewer," said Izzo. "The county has a long-term commitment to septic elimination—we know that it will have a positive impact on water quality in the Inland Bays."

Generally, groundwater receiving the nutrients from septic systems moves slowly, so improvements in water quality may not be seen for more than a decade. But in communities located right on a bay or creek where groundwater is high and many systems have failed, residents have reported seeing clearer water very soon after removal of old septics," said Izzo.

When the county began their effort to bring public sewer service to homes around the Bays, some of the towns in the watershed were already served by wastewater treatment plants. Today, all incorporated towns in the watershed provide public sewer to residents. The county operates a total of 22 sewer districts in the Inland Bays watershed.

When asked about private community wastewater systems, Izzo explained, "If they are maintained and functioning properly, they are allowable, but new community systems are

Bays: Sussex County's Drive to Eliminate Septic



not permitted if they are in a county sewer planning area."

In order to convert septic systems to public sewer and accommodate new development, the county had to build new wastewater treatment plants to create the capacity needed to serve additional customers. Piney Neck was built in 1994 to serve the Dagsboro and Frankford areas, the Inland Bay Regional Wastewater Plant came on line in 1990, and in 1996, the Wolf Neck Plant was built to serve the fast growing population around Route 1 between Lewes and Rehoboth.

To plan for this long-term drive to convert septic to public sewer, the county created new sewer districts. Detailed information on those districts and the status of the work can be found on the county's website sussexcountyde.gov/sewer-water.

"The next areas to serve are the Love Creek area and Herring Creek," said Izzo. "We've secured the funding for Love Creek and the design is almost complete. We are in the process of estimating costs for the Herring Creek project, and will go to public referendum early next year."

"Installing the infrastructure for public sewer is very expensive so we look for ways to ride the back of new developments coming into an area by sizing the pipes to serve not just the new development but to accommodate existing homes in the area," said Izzo.

"We still need to complete the area stretching from Millville to Vines Creek on the south side of Indian River Bay, finish the planning for Herring Creek, and consider the area from Oak Orchard Road toward Millsboro," said Izzo.

"The challenge the next county engineer faces will be to find ways to keep rates economical. Everyone wants public sewer, but how do you make it affordable."

Why do we care about eliminating septic systems?

A septic system can never produce zero wastewater discharge.

A small septic system, on average, leaches 10.6 pounds of nitrogen and 0.7 pounds of phosphorus into the groundwater each year. If the system is failing, is not maintained or is improperly sited, those numbers can be much higher. These nutrients enter the groundwater and flow through the soil, eventually entering the bays—much like surface runoff, but at a slower rate. The closer houses are to water, the greater the impact.

When these nutrient loads are multiplied by the approximately 18,000 septic systems in the Inland Bays watershed, their total nutrient contribution to the bays is significant. Conversion of existing septic systems to central sewer removes at least 80-90% of that nutrient load. Tying communities to sewer service is an effective way to reduce the flow of nutrients to our bays.

What you can do if you have a septic system:

- Have your septic tank pumped out every 3 years.
- Contact a licensed Class "E" system contractor whenever you have a problem with your disposal system.
- Find out more—

  Simply Septics: A Guide for Delaware Homeowners tinyurl.com/simplyseptics

  Watch a YouTube video! tinyurl.com/septics-risks

(Wild cont. from page 1)

Osprey Photo Credit: Simon Carrasco from Alameda, CA via Wikimedia Commons

But to assure long-term success, habitat loss had to be addressed. In partnership with the National Wild Turkey Federation, efforts began to protect what remained of turkey habitat through public and hunter education, research, tree planting, stream restoration, and control of invasive plant species.

The effort was a success. Today Delaware's wild turkey population is estimated at around 4,000.

In 1991, a wild turkey hunting season was established to manage the population and is open one month each spring. Randy Cole, an environmental scientist and avid turkey hunter in Sussex County said, "There is certainly a viable population, but it is managed quite closely…they only allow you to shoot male adult birds so that the young can mature and reproduce."

Turkeys, like our waterfowl, benefit from the work of organizations like Ducks Unlimited and the National Wild Turkey Federation, whose motto is "Save the Habitat. Save the Hunt." While habitat loss will continue to set a cap on the turkey population, conservation and management efforts have restored it.

Bald eagles and ospreys

The disappearance of bald eagles and ospreys from the skies over the Inland Bays began after World War II and was a mystery that took some time to solve.

Rachel Carson's book 'Silent Spring,' published in 1962, is credited with sounding the alarm on the dangers of the insecticide known as DDT. It was marketed in the mid-20th century for agricultural, home and garden use, and within thirty years approximately 675,000 tons of DDT had been applied in the United States. The toxin worked its way through the food chain from plankton and aquatic insects, to fish that consumed them—eventually accumulating in the bodies of fish-eating birds, causing them to lay eggs with shells too thin to survive incubation.

The population rebound for these species is largely attributed to the banning of DDT by the EPA in 1972, after which the incidence of brittle eggs within affected bird populations began to decline. The passing of the Endangered Species Act the following year in 1973 also assisted this recovery.

But bald eagle and osprey populations also felt the pressure of diminishing habitat. The trees where they nested, and to which they returned each year, were being lost to sea level rise, land subsidence, and coastal development.

When provided with manmade platforms to use as nesting sites, ospreys took to the opportunity and prospered. Around the Inland Bays, ospreys are now a common sight

Certain animals have a way of capturing our imagination. Some inspire us with their physical beauty and strength, others speak to our hearts, and still others to our appetite.

YOU CAN HELP!

Join the Citizen Monitoring Osprey Program
tinyurl.com/ospreymonitor

Tell us About Your Bald Eagle Sightings—
Pin it to a map! **tinyurl.com/baldeaglemap**

Help with the Wild Turkey Survey
tinyurl.com/wildturkeysurvey
2016 survey begins next summer

A mature Bald Eagle *Haliaeetus leucocephalus*
Photo credit: Ken Thomas KenThomas.us Wikimedia Commons

and the population has remained stable since the early 1990's with over 200 active nests recorded statewide, nearly half in the Inland Bays.

The bald eagle, a species that prefers large mature trees for cover and protection, did not adapt to using platforms, and their return has not been as dramatic, though their populations are recovering. While only two bald eagle nests were found in the Inland Bays in 1987, there was a modest increase to nine nests as of 2009. They continue to be monitored and protected. Because they are species at the top of the food chain, bald eagles and ospreys are good indicators of the quality of the environments where they live. The positive trend in their populations is good news for the Bays.

So what does it really take to bring back a species?

"We have to consider what actions we can take to support recoveries," explains Kate Fleming, a wildlife biologist for DNREC. "What led to decline, and what are the disturbances that threaten population recovery?" No conservation actions can be taken without first identifying the key stressers to the species in question and the habitat as a whole.

Accurate scientific data is critical. Efforts such as the Wildlife Action Plan in Delaware, the Endangered Species Act listing and the CIB's Comprehensive Conservation and Management Plan use this data to identify species in need and the stressors affecting them, creating realistic conservation goals and offering a roadmap to reach them.

Within the Inland Bays watershed, many projects reflect such conservation efforts. At Angola Neck Preserve on Love Creek and Rehoboth Bay, the CIB began work began last winter on the reforestation of 40 acres of former farm fields. In addition to reducing pollutants entering the Bays, this project will benefit migratory songbirds such as the eastern towhee, yellow-breasted chat, grasshopper sparrow, and American redstart.

On Middle Island, near Massey's Ditch, between Rehoboth and Indian River Bays, the CIB erected a manmade nesting platform that today successfully provides nesting areas to egrets and herons, replacing trees that had once been there.

Planning is underway for a project on Middle Island to restore five acres each of tidal wetlands and upland nesting habitat through the re-use of dredge material. Islands offer protection from predators for many species and this restoration will benefit herons, egrets, terns, American oystercatchers, Diamondback terrapins and horseshoe crabs.

The recovery of wild turkey, osprey, and even the modest recovery of the bald eagle demonstrate the power of research, education and conservation efforts. In the 2011 State of the Bays Report for the Inland Bays, the status bar for living resources had a positive trend, a trend we hope to see continued in the 2016 report.

WHO'S *on board with the Bays?*

By Jenn Jones, Development & Marketing Coordinator

GEORGE JUNKIN of South Bethany admits that he "pretty much knew nothing" about water quality when he first retired in 2005, but quickly became aware of the issues facing our Bays and began to take action.

He helped form the South Bethany Water Quality Committee in June 2007 with the goal to make the South Bethany canals "fishable and swimmable."

Through George's leadership as chair of the committee, the Town of South Bethany has worked with the CIB to secure project grants to improve the quality of waters entering the South Bethany canals and Little Assawoman Bay. The stormwater improvement projects not only clean the Bay, the native landscape plantings beautify the community.

George works hard to educate everyone around him about the Inland Bays, encourages his friends and neighbors to get involved, to make a donation, and become a Friend of the Bays. He and his wife Barbara are founding Patron of the Bays members and can be counted on to support every fundraiser and benefit for the Bays. Thank you George for all you do!

We can all make a difference in our own way to help the Inland Bays…How can you get on board with the Bays? Contact Jenn Jones at development@inlandbays.org or visit inlandbays.org for more information!

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